



AP

TRANSMITTAL OF APPEAL BRIEF (Small Entity)

Docket No.  
MSU 4.1-526

In Re Application Of: Linda S. Mansfield, Mary G. Rossano, Alice J. Murphy and Ruth A. Vrable

Application No.	Filing Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
09/670,096	September 26, 2000	Padmavathi Baskar	21036	1645	7494

Invention: VACCINE TO CONTROL EQUINE PROTOZOAL MYELOENCEPHALITIS IN HORSES

COMMISSIONER FOR PATENTS:

Transmitted herewith is the Appeal Brief in this application, with respect to the Notice of Appeal filed on:

April 10, 2007

☐

☒ Applicant claims small entity status. See 37 CFR 1.27

The fee for filing this Appeal Brief is: \$250.00

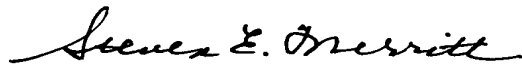
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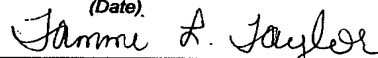
Dated: May 23, 2007

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Typed or Printed Name of Person Mailing Correspondence

cc:

MSU 4.1-526  
Appl. No. 09/670,096  
May 21, 2007  
Appeal Brief



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 09/670,096 Confirmation No. 7494  
Applicants : Linda S. Mansfield, Mary G. Rossano, Alice  
J. Murphy, and Ruth A. Vrable  
Title : VACCINE TO CONTROL EQUINE PROTOZOAL  
MYELOENCEPHALITIS IN HORSES  
Filed : September 26, 2000  
TC/A.U. : 1645  
Examiner : Padmavathi Baskar, Ph.D.  
Docket No. : MSU 4.1-526  
Customer No. : 21036

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Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**BRIEF UNDER 37 C.F.R. § 41.37**

Sir:

This is an appeal from a final rejection in the above entitled application. The claims on appeal are set forth as Claims Appendix. An oral hearing will be requested. Enclosed is the fee due upon filing of the Brief.

05/29/2007 MGE BREM1 00000091 09670096

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**(1) Real Party in Interest**

The real party in interest is the Board of Trustees operating Michigan State University, East Lansing, Michigan, a constitutional corporation of the State of Michigan, which is the assignee of the above entitled application.

**(2) Related Appeals and Interferences**

A prior decision by the Board in the present application Serial No. 09/670,096 is enclosed (Appeal No. 2005-2386). In the decision, the Board reversed the enablement rejection. Parent Application Serial No. 09/513,086, directed to a composition of antigens as a vaccine and methods of treating an equid with the antigens, is on appeal. The present application is related to Application Serial No. 09/670,355, directed to DNA vaccines, which was abandoned after an affirmation by the Board (enclosed). A decision by the Board is also enclosed for Application Serial No. 09/669,843, directed to monoclonal

antibodies (Appeal No. 2004-1976). There are no other related appeals and interferences.

**(3) Status of Claims**

Claim 1 was cancelled in an Amendment under 37 C.F.R. 1.116(b)(1) as noted below. Claims 3-20 and 22 were cancelled during prosecution of the application. Claims 2 and 21 remain pending in the application and are on appeal.

**(4) Status of Amendments**

Claim 1 was rejected in the Final Office Action, mailed December 27, 2006, under 35 U.S.C. § 103(a) as being unpatentable over Liang et al. 1998, (*Infection and Immunity*, 66 (5), 1834-1838), Liang et al. 1997, (*Anal. Biochem.*, 250 (1), 61-65) or each in view of Harlow and Lane, (*Antibodies, A Laboratory Manual*, Chapters 5 and 6, Cold Spring Harbor Press, 1988). Claim 1 was cancelled in an Amendment under 37 C.F.R. 1.116(b)(1), mailed on February 27, 2007. The amendment was entered in an Advisory Action mailed April 09, 2007. The rejection of Claims 21 and 2 was

maintained.

**(5) Summary of Claimed Subject Matter**

The claimed subject matter in independent Claim 21 is a method for treating an equid infected with *Sarcocystis neurona* comprising:

(a) providing a mixture of antibodies against a 16  $\pm$  4 kDa antigen and a 30  $\pm$  4 kDa antigen, both of which are specific to *Sarcocystis neurona*, wherein the antibodies are selected from the group consisting of polyclonal antibodies from serum from an animal immunized with the antigen and monoclonal antibodies from a hybridoma, and wherein the antibodies are in a pharmaceutically acceptable carrier; and

(b) inoculating the equid with the antibodies in the carrier to treat the equid.

Support for this independent claim is found at page 5, lines 13-24; page 7, lines 21-30; and page 26, line 20-26 of the specification. Support for a passive immunity vaccine (defined on page 12, lines 31-35) comprising polyclonal antibodies is found on page 26, line 27 through page 27, line 3 of the specification. Support for a passive immunity vaccine comprising monoclonal antibodies is found

on page 27, lines 4-22 of the specification. Example 1, starting on page 33, line 20 describes the preparation of monoclonal antibodies against a 16  $\pm$ 4 kDa antigen and/or a 30  $\pm$ 4 kDa antigen of *Sarcocystis neurona*.

**(6) Grounds of Rejection to Be Reviewed on Appeal**

(A.) Claim 21 and 2 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Liang et al. 1998, (*Infection and Immunity*, 66 (5), 1834-1838), Liang et al. 1997, (*Anal. Biochem.*, 250 (1), 61-65) each in view of Harlow and Lane, (*Antibodies, A Laboratory Manual*, Chapters 5 and 6, Cold Spring Harbor Press, 1988).

**(7) Argument**

(A.) Claim 21 and 2 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Liang et al. 1998, (*Infection and Immunity*, 66 (5), 1834-1838), Liang et al. 1997, (*Anal. Biochem.*, 250 (1), 61-65) each in view of Harlow and Lane, (*Antibodies, A Laboratory Manual*, Chapters 5 and 6, Cold Spring Harbor Press, 1988).

The four factual inquires enunciated by the Supreme Court in *Graham v. John Deere* as a background for determining obviousness are as follows:

- (A) Determining the scope and contents of the prior art;
- (B) Ascertaining the differences between the prior art and the claims in issue;
- (C) Resolving the level of ordinary skill in the pertinent art; and
- (D) Evaluating evidence of secondary considerations.

See M.P.E.P. 2141, I., citing *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966). M.P.E.P. 2141.02 explains that ascertaining the differences between the prior art and the claims at issue requires interpreting the claim language, and considering both the invention and the prior art

references as a whole. As further clarified by the Federal Circuit, basic considerations which apply to obviousness rejections include a requirement that the claimed invention must be considered as a whole; the references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination; and that the references must be viewed without the benefit of hindsight reasoning. *Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986). "It is difficult but necessary that the decisionmaker forget what he or she has been taught ... about the claimed invention and cast the mind back to the time the invention was made (often as here many years), to occupy the mind of one skilled in the art who is presented only with the references, and who is normally guided by the then-accepted wisdom in the art." *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

Liang et al. 1997 teaches three proteins that were purified from *S. neurona* merozoites with molecular weights of 100, 30, and 19 kDa. Harlow and Lane teaches general methods for the production of monoclonal antibodies and



polyclonal antibodies from antigens. Liang et al. 1998 teaches that serum and cerebrospinal fluid (CSF) from horses with a clinical diagnosis of a neurologic disorder resembling equine protozoal myeloencephalitis (EPM) reacted with combinations of Sn30, Sn16, Sn14, and Sn11 proteins from *Sarcocystis neurona* (*S. neurona*) to form various band patterns on an immunoblot. The serum and CSF samples were grouped together by Liang et al. 1998 based upon the resulting band patterns. Liang et al. 1998 then teaches that *in vitro* neutralization assays against *Sarcocystis neurona* merozoites isolated from bovine turbinate cell culture revealed "significant differences in inhibitory activities between the groups of serum and CSF samples with different immunoblot band patterns" (Liang et al. 1998: page 1837, first full paragraph.) However, when Liang et al. 1998 correlated band patterns with inhibitory activities it was concluded that no inhibitory activity correlating with the antibody to Sn30 (the 30 kDa protein) was noted. (Liang et al. 1998: page 1836, first paragraph; Sn30 is a 30 kDa protein as noted in the first paragraph, "Immunoblot band patterns", on page 1835.) This can be clearly seen with sample N6 which recognizes the Sn30 protein of *Sarcocystis*

neurona. (Liang et al. 1998: Figure 2 on page 1836). Therefore, a person of skill in the art would not be motivated to pursue the claimed method.

The Supreme Court has recently held that the teaching, suggestion, motivation (TSM) test when applied as a rigid and mandatory formula is incompatible with the Court's precedents. Nonetheless, according to the Court, the TSM test captures a helpful insight. *KSR Int'l Co. v. Teleflex Inc.*, No. 04-1350, slip op. at 14, 15 (U.S. April 30, 2007). Therefore, the teaching or suggestion to make the claimed combination is to be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The cited prior art references do not teach or suggest to a person of skill in the art all of the limitations of the claimed method, without consideration of Applicants' disclosure. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Liang et al. 1998, Liang et al. 1997, and Harlow and Lane, either taken alone or in combination, do not suggest to a person of

skill in the art the desirability of a method for treating an equid infected with *Sarcocystis neurona* by inoculating a mixture of antibodies against a 16  $\pm$ 4 kDa antigen and a 30  $\pm$ 4 kDa antigen of *Sarcocystis neurona* as claimed in Claims 21 and 2.

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). Therefore, it is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983). Considered in its entirety, Liang et al. 1998 teaches away from a method for treating an equid infected with *Sarcocystis neurona* by inoculating a mixture of antibodies against a 16  $\pm$ 4 kDa antigen and a 30  $\pm$ 4 kDa antigen of *Sarcocystis neurona* as claimed in Claims 21 and 2. According to Liang et al. 1998, "[n]eutralization assays revealing significant differences in inhibitory activities between the groups of serum and CSF samples with different immunoblot band patterns strongly suggest that antibodies

specific for Sn14 and Sn16 have protective activity against *S. neurona*, at least in vitro (Fig. 1 and 2) and support the use of the immunoblot test in diagnosis of EPM. Antibodies to Sn30 are not recognized as specific since a 30-kDa antigen immunoreactive with sera from horses with EPM is found in other *Sarcocystis* spp." (Liang et al. 1998: page 1837, column 1, first full paragraph). Nothing in the references suggest that the Sn30 would be of interest, since Liang et al. 1998 actually teaches that the Sn30 antibodies are not even recognized as being specific for the 30 kDa antigen from *Sarcocystis neurona*. The serum antibodies from horses with EPM are known to also react with a 30 kDa antigen from other *Sarcocystis* spp. Armed with this knowledge, one of ordinary skill in the art would not have been motivated by Liang et al. 1998, taken alone or in combination with the other cited references, to treat an equid infected with *Sarcocystis neurona* by the method set forth in Claims 21 and 2. Liang et al. 1998 would actually lead a person of ordinary skill in the art away from the claimed invention, since *in vitro* neutralization assays against *Sarcocystis neurona* merozoites show that the Sn30 antigen provides no inhibitory activity. Therefore, Liang

et al. 1998, Liang et al. 1997, and Harlow and Lane, either taken alone or in combination, do not provide motivation to one of ordinary skill in the art to a method for treating an equid infected with *Sarcocystis neurona* by inoculating a mixture of antibodies against a 16  $\pm$ 4 kDa antigen and a 30  $\pm$ 4 kDa antigen of *Sarcocystis neurona* as claimed in Claims 21 and 2.

In the claimed method, an equid is inoculated with a mixture of antibodies against a 16  $\pm$ 4 kDa antigen and a 30  $\pm$ 4 kDa antigen, both of which are specific to *Sarcocystis neurona*, wherein the antibodies are selected from the group consisting of polyclonal antibodies from serum from an animal immunized with the antigen and monoclonal antibodies from a hybridoma, and wherein the antibodies are in a pharmaceutically acceptable carrier. The cited references, taken alone or in combination, do not teach or suggest all of these limitations of the claimed method. None of the cited references teach using the mixture of antibodies, including antibodies against the 30 kDa antigen, with or without a pharmaceutically acceptable carrier. The cited references, either taken alone or in combination, do not show or suggest the method claimed by Applicants. Thus, it

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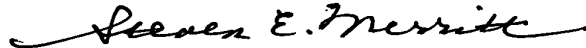
appears that this is an improper rejection based upon impermissible hindsight reasoning. The requirement "at the time the invention was made" is to avoid impermissible hindsight (MPEP §2141.01 III). The references must be viewed without the benefit of impermissible hindsight vision. *Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986). Therefore, the claimed method is not obvious over the cited references. Reversal of the Final Rejection is requested.

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(B.) Conclusion

In light of the above, it is now believed that the claims are not obvious over Liang et al. 1998, Liang et al. 1997, each in view of Harlow and Lane. Therefore, Claims 21 and 2 are patentable. Reversal of the Final Rejection is requested.

Respectfully submitted,



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**CLAIMS APPENDIX**

2. The method composition of Claim 21 wherein the antibodies are monoclonal antibodies.

21. A method for treating an equid infected with *Sarcocystis neurona* comprising:

(a) providing a mixture of antibodies against a 16  $\pm$ 4 kDa antigen and a 30  $\pm$ 4 kDa antigen, both of which are specific to *Sarcocystis neurona*, wherein the antibodies are selected from the group consisting of polyclonal antibodies from serum from an animal immunized with the antigen and monoclonal antibodies from a hybridoma, and wherein the antibodies are in a pharmaceutically acceptable carrier; and

(b) inoculating the equid with the antibodies in the carrier to treat the equid.



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EVIDENCE APPENDIX

(None.)

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**RELATED PROCEEDINGS APPENDIX**

Attached are copies of the following:

1. Decision by the Board for the present Application No. 09/670,096 (Appeal No. 2005-2386).
2. Decision by the Board for Application No. 09/670,355.
3. Decision by the Board for Application No. 09/669,843 (Appeal No. 2004-1976).

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The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

IAN C. McLEOD

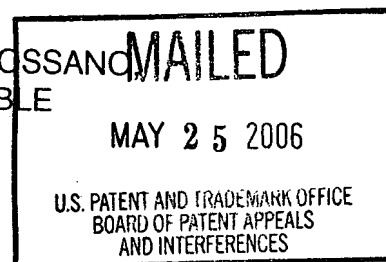


UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

Ex parte LINDA S. MANSFIELD, MARY G. ROSSANO  
ALICE J. MURPHY and RUTH A. VRABLE

Appeal No. 2005-2386  
Application No. 09/670,096



ON BRIEF

Before GRIMES, GREEN, and LEOVITZ Administrative Patent Judges.  
GREEN, Administrative Patent Judge.

READ

JUN - 5 2006

DECISION ON APPEAL

Ian C. McLeod

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1, 2 and 21,<sup>1</sup> all of the pending claims, which are reproduced below:

<sup>1</sup> An amendment after final was filed concurrently with the Appeal Brief, dated August 20, 2004, and stamped August 23, 2004. Appellants state in the Appeal Brief that an Amendment was filed August 20, 2004, and in response, the examiner in the Examiner's Answer merely states that appellants' statement is correct, but does not explicitly state that the amendment was entered. But because the rejection of claim 2 under 35 U.S.C. § 112, second paragraph, for lack of antecedent basis was withdrawn, and the amendment after final remedied that issue, we infer that the amendment was entered. Thus, the claims as reproduced here are as amended by the August 23, 2004, amendment after final.

C: Mansfield  
Hudson  
6/6/06

1. A composition for treating an equid infected with Sarcocystis neurona comprising a mixture of isolated antibodies against a  $16 \pm 4$  kDa antigen of Sarcocystis neurona and isolated antibodies against a  $30 \pm 4$  kDa antigen of Sarcocystis neurona wherein the antibodies are from serum of an animal immunized with the antigen and wherein the mixture is in a pharmaceutically acceptable carrier.
2. The method of claim 21 wherein the antibodies are monoclonal antibodies.
21. A method for treating an equid infected with Sarcocystis neurona comprising:
  - (a) providing a mixture of antibodies against a  $16 \pm 4$  kDa antigen and a  $30 \pm 4$  kDa antigen, both of which are specific to Sarcocystis neurona, wherein the antibodies are selected from the group consisting of polyclonal antibodies from serum from an animal immunized with the antigen and monoclonal antibodies from a hybridoma, and wherein the antibodies are in a pharmaceutically acceptable carrier; and
  - (b) inoculating the equid with the antibodies in the carrier to treat the equid.

The claims stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter that was not described in the specification in such a way so as to enable one skilled in the art to which it pertains or with which it is most nearly connected to make and/or use the invention. After careful review of the record and consideration of the issue before us, we reverse.

#### DISCUSSION

Claims 1, 2 and 21 stand rejected under 35 U.S.C. § 112, first paragraph, for lack of enablement.

"[A] specification disclosure which contains a teaching of the manner and process of making and using the invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented must be taken as in compliance with the enabling requirement of the first

paragraph of § 112 unless there is reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support.” In re Marzocchi, 439 F.2d 220, 223, 169 USPQ 367, 369 (CCPA 1971) (emphasis in original). “[It] is incumbent upon the Patent Office, whenever a rejection on this basis is made, to explain why it doubts the truth or accuracy of any statement in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement.” Id. at 224, 169 USPQ at 370. Here, the examiner has not provided “acceptable evidence or reasoning which is inconsistent” with the specification, and therefore has not met the initial burden of showing nonenablement.

In making the enablement rejection, the examiner engages in the analysis of the factors as set forth in In re Wands, 858 F.2d 731, 8 USPQ2d 1400 (Fed. Cir. 1988). Examiner’s Answer, page 5.

The examiner notes that given the high rate of exposure of horses to S. neurona and the low incidence of clinical equine protozoal myeloencephalitis (EPM), “indicate[s] that most horses develop effective immunity (no clinical symptoms of disease) that may prevent merozoite entry into the central nervous system.” Id. at 6. The examiner goes on to state that the pathogenesis of the disease is not fully understood, and that clinical manifestations of the disease only occur in a small percentage of seropositive horses, citing Cutler<sup>2</sup> in noting

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<sup>2</sup> Cutler et al. (Cutler), “Immunoconversion against Sarcocystis neurona in normal and dexamethasone-treated horses challenged with S. neurona sporocysts,” Veterinary Parasitology, Vol. 95, pp. 197-210 (2001).

that "it is important and necessary to identify factors that govern progression from an apparent infection to clinically evident neurological disease, EPM . . . in horses." Id.

According to the examiner, "[t]he treatment of S. neurona infection in an equid with antibodies is highly complex and unpredictable because relative to the infection, the development of clinical spreading of the disease i.e., merozoite entry into the central nervous system crossing blood brain barrier is not known as most of the horses develop immunity without EPM." Examiner's Answer, page 6. As "the prior art does not teach administration of a mixture of isolated antibodies against a 16 kD antigen of S. neurona and isolated antibodies against a 30 kD antigen of S. neurona to an infected horse with EPM which would resolve the infection in CNS[,] . . . [t]hus there is a lack of understanding in the art with respect to the pathogenesis of S. neurona infection in horses that develop EPM." Id. at 7.

The examiner also relies on Liang 1998<sup>3</sup> to support the proposition that "not all antibodies generated during infection will neutralize the merozoites." Examiner's Answer, page 7. The examiner asserts that from Liang 1998 it appears that extended exposure to antiserum appears to be necessary, and that in vitro data do not necessarily correlate to the results that will be obtained in vivo. See id. Moreover, according to the examiner, "it is unclear whether such

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<sup>3</sup> Liang et al. (Liang 1998), "Evidence that Surface Proteins Sn14 and Sn16 of *Sarcocystis neurona* Merozoites Are Involved in Infection and Immunity," Infection and Immunity, Vol. 66, No. 5, pp. 1834-1838 (1998).

an immunotherapy can be used to treat all horses that are infected with S. neurona.” Id. at 8. The examiner is also concerned that the specific antibodies used in the claimed immunotherapeutic methods are not characterized. See id.

We do not find that the examiner has provided evidence and/or reasoning that the claims are not enabled by the specification. As noted by appellants, “since many horses exposed to Sarcocystis neurona do not have clinical signs of EPM but have immunity to Sarcocystis neurona the serum antibodies are likely effective for protecting against the parasite.” Appeal Brief, page 9. Given that, as further noted by appellants, “it would appear to be reasonable to believe that horses with EPM have an inadequate immune response to the parasite which is not sufficient to prevent entry of the parasite into the CNS and that boosting the immune response with antibodies against the 16 and 30 kDa antigens might provide a sufficient boost to an infected horse’s immune response to inhibit entry of the parasite into the CSF.” Id. at 16.

Moreover, Liang 1998 teaches that Sarcocystis neurona is sensitive to specific antibodies, and thus does not support the examiner’s contention that the claims are not enabled. In regard to the examiner’s statement that “it is unclear whether such an immunotherapy can be used to treat all horses that are infected with S. neurona,” there is no requirement that the claimed method work with all horses that are infected with S. neurona.

In addition, Appellants submitted a declaration on April 1, 2003, Appendix B to the Appeal Brief, demonstrating that both the 16 and 30 kDa antigens

appeared to be more neutralizing than either antibody alone. See Appeal Brief, page 14. In response, the examiner argues that although “[t]he Declaration provides evidence that CSF from infected horses contains antibodies to 16kD and 30kD [antigens] and such antibodies neutralize the merozoites in vitro (neutralization assays) only,” the declaration “does not provide any evidence that the claimed composition comprising said antibodies are useful for treating an equid infected with S. neurona.” Examiner’s Answer, page 13.

Thus, the examiner’s principal concern appears to be that the specification provides no in vivo examples of treating a horse. See, e.g., Examiner’s Answer, pages 6 and 8. The examiner notes that the specification “only discloses that multiple isolates of merozoites have been obtained by culturing sporozoites from opossum,” id. at 8, and that “[t]he specification . . . provides no working examples demonstrating . . . enablement for the claimed composition or a method that is required in this under developed art. The specification only teaches culturing sporocysts and merozoites,” id. at 9.

The presence or absence of a working example, however, is not determinative on the issue of enablement. It is just one factor that is to be weighed with the other factors. In the case at issue, the examiner has not met the burden of demonstrating that the specification does not enable the claims, and the rejection under 35 U.S.C. § 112, first paragraph, for lack of enablement, is reversed.



### OTHER ISSUES

Appellants' and the examiner's attention is directed to related Appeal Number 2004-1976, U.S.S.N. 09/669,843. That appeal contained a claim to:

A monoclonal mixture comprising an antibody that selectively binds to a  $16 \pm 4$  kDa antigen of Sarcocystis neurona and a monoclonal antibody that selectively binds to a  $30 \pm 4$  kDa antigen of Sarcocystis neurona wherein the antigens are separately isolated from Sarcocystis neurona merozoites by two-dimensional polyacrylamide gel electrophoresis and separately used to produce hybridomas which produce the monoclonal antibodies for the mixture.

In the 2004-1976 appeal, we affirmed a rejection under 35 U.S.C. § 103(a) over the combination of Liang 1998 or Liang 1997<sup>4</sup> and Harlow.<sup>5</sup>

Similarly, in the instant appeal, claim 1 is directed to:

A composition for treating an equid infected with Sarcocystis neurona comprising a mixture of isolated antibodies against a  $16 \pm 4$  kDa antigen of Sarcocystis neurona and isolated antibodies against a  $30 \pm 4$  kDa antigen of Sarcocystis neurona wherein the antibodies are from serum of an animal immunized with the antigen and wherein the mixture is in a pharmaceutically acceptable carrier.

The recitation of "for treating an equid infected with Sarcocystis neurona" is a statement of intended use, and not a patentable limitation. See In re

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<sup>4</sup> Liang et al. (Liang 1997), "Micropreparative High Resolution Purification of Proteins by a Combination of Sodium Dodecyl Sulfate-Polyacrylamide Gel Electrophoresis, Isoelectric Focusing, and Membrane Blotting," Anal. Biochem., Vol. 250, pp. 61-65 (1997).

<sup>5</sup> Harlow et al. (Harlow, Antibodies, A laboratory Manual, Chapter 6, Col Spring Harbor Press (1988).

Schreiber, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997). Upon return of the appeal, the examiner may wish to consider the patentability of instant claim 1 in view of the references and the rejection as set forth in Appeal Number 2004-1976.

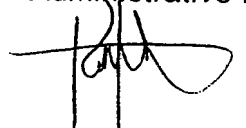
CONCLUSION

Because the examiner has not set forth a prima facie case of unpatentability, the rejection of claims 1, 2 and 21 under 35 U.S.C. § 112, first paragraph, for lack of enablement, is reversed. Upon receipt of the case, however, the examiner may wish to consider the patentability of claim 1 in view of the rejection under 35 U.S.C. § 103(a) as set forth in related Appeal 2004-1976.

REVERSED

  
Eric Grimes  
Administrative Patent Judge

  
Lora M. Green  
Administrative Patent Judge

  
Richard M. Lebovitz  
Administrative Patent Judge

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Appeal No. 2005-2386  
Application No. 09/670,096

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The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

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IAN C. MCLEOD

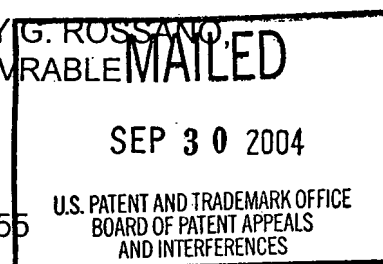
Paper No. 13

**UNITED STATES PATENT AND TRADEMARK OFFICE**

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Ex parte LINDA S. MANSFIELD, MARY G. ROSSANO,  
ALICE J. MURPHY and RUTH VRABLE

Appeal No. 2003-1919  
Application No. 09/670,355



ON BRIEF

Before WILLIAM F. SMITH, GRIMES, and GREEN, Administrative Patent Judges.

GREEN, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 10-12, 18-20, 44, 45 and 47-52. Claims 10 and 51 are representative of the subject matter on appeal, and read as follows:

10. A vaccine for protecting an equid from a Sarcocystis neurona infection comprising a DNA from Sarcocystis neurona that encodes at least a  $16 \pm 4$  kDa antigen and/or  $30 \pm 4$  kDa antigen of Sarcocystis neurona.

Co: 9.

51. A vaccine composition which comprises an effective immunizing amount of DNA derived from Sarcocystis neurona capable of inducing an antibody immune response, and a pharmacologically acceptable carrier.

Claims 10-12, 18-20, 44, 45 and 47-52 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention, i.e., lack of adequate written description. In addition, claims 10-12, 18-20, 44-45 and 47-52 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter that was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention, i.e., lack of enablement. Finally, claims 51 and 52 stand rejected under 35 U.S.C. § 112, second paragraph. After careful review of the record and consideration of the issues before us, we affirm the rejection of claims 10-12, 18-20, 44-45 and 47-52 under 35 U.S.C. § 112, first paragraph, for lack of adequate written description, and the rejection of claims 51 and 52 under 35 U.S.C. § 112, second paragraph, and decline to reach the merits of the rejection of claims 10-12, 18-20, 44-45 and 47-52 under 35 U.S.C. § 112, first paragraph, for lack enablement.

DISCUSSION

1. Rejection under 35 U.S.C. § 112, first paragraph, written description

Claims 10-12, 1-20, 44, 45 and 47-52 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention, i.e., lack of adequate written description.

According to the rejection, "[r]eview of the present specification, the art of record, and a search of the sequence databases for polynucleotides and/or polypeptide sequences of 16(+4) kD antigen and the 30(+4) kD antigen indicate that these sequences have not been identified nor described." Examiner's Answer, page 4. The rejection further contends "the limitation 'at least' in the claims does not limit the invention to 16(+4) kD and/or 30(+4) kD antigen of S. neurona and broadly reads on any antigen that is not disclosed. The specification describes general methods of cloning cDNA sequences from expression libraries; however, the sequences obtained by this method for 16(+4) kD and/or 30(+4) kD antigen are not disclosed." Id. at 4-5. The rejection concludes that "the claimed invention as a whole is not adequately described and is not conventional in the art as of Appellants' effective filing date." Id. at 5 (emphasis in original).

With respect to the issue of conception in the context of an interference count, the Court of Appeals for the Federal Circuit, our reviewing court, has stated that "irrespective of the complexity or simplicity of the method of isolation employed, conception of a DNA, like conception of any chemical substance requires a definition of that substance other than by its functional utility." Fiers v. Revel, 984 F.2d 1164, 1169, 25 USPQ2d 1601, 1604 (Fed. Cir. 1993). The court specifically rejected Fiers' argument "that the existence of a workable method for preparing a DNA establishes conception of that material." Id.

In Enzo Biochem, Inc. v. Gen-Probe Inc., 296 F.3d 1316, 63 USPQ2d 1602 (Fed. Cir. 2002), in determining whether or not a claim to a nucleotide sequence met the written description requirement, the court adopted a portion of the Guidelines proffered by the United States Patent and Trademark Office (USPTO). The court stated that:

The written description requirement can be met by "showing that an invention is complete by disclosure of sufficiently detailed, relevant identifying characteristics . . . i.e., complete or partial structure, other physical and/or chemical properties, functional characteristics when coupled with a known or disclosed correlation between function and structure, or some combination of characteristics.

Enzo Biochem, 296 F.3d at 1324, 63 USPQ2d at 1613 (citations omitted).

In construing the above requirement, the court in In re Wallach, 378 F.3d 1330, 71 USPQ2d 1939 (Fed. Cir. 2004), recognized "that the written description requirement can in some cases be satisfied by functional description." Id., 378

F.3d at 1335. The court held, however, that

such functional description can be sufficient only if there is also a structure-function relationship known to those of ordinary skill in the art. As we explained above, such a well-known relationship exists between a nucleic acid molecule's structure and its function in encoding a particular amino acid sequence: Given the amino acid sequence, one can determine the chemical structure of all nucleic acid molecules that can serve the function of encoding that sequence. Without that sequence, however, or with only a partial sequence, those structures cannot be determined and the written description requirement is consequently not met.

Id.

In the instant case, as noted by the rejection, neither the disclosure as filed, nor the prior art, discloses any sequence, either amino acid or nucleic, for either the 16(+4) kD and/or 30(+4) kD antigens. Consequently, the written description requirement is not met, and the rejection is affirmed.

Appellants argue with respect to the rejection of claims 10-12, 18-20, 44, 45 and 47-50 that they had "possession of Sarcocystis neurona which contains DNA encoding the 16  $\pm$ 4 and 30  $\pm$ 4 antigens. Thus, the applicants have possession of Sarcocystis neurona DNA encoding the 16  $\pm$ 4 and 30  $\pm$ 4 antigens." Appeal Brief, page 7. Appellants argue further that "[c]onstructing and screening an expression library for clones containing DNA encoding a particular protein is routine in the art," and thus "a person of ordinary skill in the art following the applicants' disclosure would have a high expectation of success of recovering clones from an expression library that express the 16  $\pm$ 4 or 30  $\pm$ 4



antigens using the antibodies against the 16  $\pm$ 4 and 30  $\pm$ 4 antigens prepared as taught in Example 1." Id. at 8.

Appellants' arguments are not convincing. First, the fact that appellants had possession of Sarcocystis neurona is not sufficient to provide possession of DNA that encodes the 16  $\pm$ 4 and 30  $\pm$ 4 antigens. As noted above, even a partial amino acid sequence of the 16  $\pm$ 4 and 30  $\pm$ 4 antigens, which would necessarily require possession of the source of the DNA, i.e., possession of Sarcocystis neurona, would not be sufficient to provide written description support for the claimed DNA encoding the 16  $\pm$ 4 and 30  $\pm$ 4 antigens. In addition, as also discussed above, the existence of a workable method to obtain the DNA sequence is also not sufficient to demonstrate written description support.

With respect to claims 51 and 52, appellants argue that appellants have possession of Sarcocystis neurona DNA, which "would be expected to encode a plurality of antigens, including the 16  $\pm$ 4 and 30  $\pm$ 4 antigens. Therefore, when the DNA is inoculated into a horse, the antigens encoded thereon are expressed in the horse." Appeal Brief, page 10. According to appellants, "[c]laims 51 and 52 do not depend on knowing the DNA sequences encoding the plurality of antigens. The claims merely require that the DNA encode one or more Sarcocystis neurona antigens. Thus, the DNA can be the entire Sarcocystis neurona genome(intact or fragmented) or particular DNA fragments therefrom." Id. at 11.

The above argument is also not found to be convincing. The disclosure as filed does not provide written description support for the use of the entire Sarcocystis neurona genome (intact or fragmented) or particular DNA fragments therefrom as a DNA vaccine. The written description is limited to a "DNA vaccine that contains or expresses at least one epitope of an antigen that has an amino acid sequence substantially similar to a unique 16 (+4kDa) antigen and/or 30 (+4) kDa antigen of Sarcocystis neurona." Specification, page 1 (Field of the Invention); see also pages 5, 17, 24 and 26. Thus, the rejection of claims 51 and 52 under 35 U.S.C. § 112, first paragraph, for lack of adequate written description, is affirmed for the reasons set forth supra with respect to the discussion of claims 10-12, 18-20, 44, 45 and 47-50.

2. Rejection under 35 U.S.C. § 112, second paragraph

Claims 51 and 52 stand rejected under 35 U.S.C. § 112, second paragraph, "as being vague and indefinite in the recitation of 'derived'. Is this DNA isolated from S. neurona?" Examiner's Answer, page 9.

This rejection is affirmed in view of appellants' statement that they will amend the term "derived" to "isolated." See Appeal Brief, page 20.

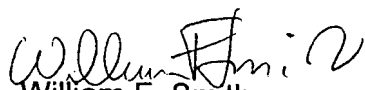
CONCLUSION

The rejection of claims 10-12, 1-20, 44, 45 and 47-52 under 35 U.S.C. § 112, first paragraph, for lack of adequate written description, and the rejection of claims 51 and 52 under 35 U.S.C. § 112, second paragraph are affirmed. Because we affirm the rejection under 35 U.S.C. § 112, first paragraph, on the

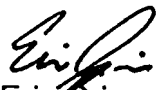
basis of lack of adequate written description, we decline to reach the merits of the rejection under 35 U.S.C. § 112, first paragraph, for lack enablement.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED



William F. Smith  
Administrative Patent Judge



Eric Grimes  
Administrative Patent Judge



Lora M. Green  
Administrative Patent Judge

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Appeal No. 2003-1919  
Application No. 09/670,355

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The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

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IAN C. McLEOD

**UNITED STATES PATENT AND TRADEMARK OFFICE**

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Ex parte LINDA S. MANSFIELD, MARY G. ROSSANO,  
ALICE J. MURPHY and RUTH A. VRABLE

**READ**

AUG 02 2005

Ian C. McLeod

Appeal No. 2004-1976  
Application No. 09/669,843

ON BRIEF

**MAILED**

JUL 29 2005

U.S. PATENT AND TRADEMARK OFFICE  
BOARD OF PATENT APPEALS  
AND INTERFERENCES

Before WILLIAM F. SMITH, GRIMES, and GREEN, Administrative Patent Judges.

GREEN, Administrative Patent Judge.

**DECISION ON APPEAL**

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 36, 51 and 52. The claims read as follows:

36. A monoclonal antibody that selectively binds to a  $16 \pm 4$  kDa antigen of Sarcocystis neurona wherein the antigen is isolated from Sarcocystis neurona merozoites by two-dimensional polyacrylamide gel electrophoresis and used to produce a hybridoma which produces the monoclonal antibody.

51. A monoclonal antibody that selectively binds to a  $30 \pm 4$  kDa antigen of Sarcocystis neurona wherein the antigen is isolated from Sarcocystis neurona merozoites by two-dimensional

*Decided*  
*Sept 29, 2005*

*Co. J. Sherman*  
*8/3/05*

polyacrylamide gel electrophoresis and used to produce a hybridoma which produces the monoclonal antibody.

52. A monoclonal mixture comprising an antibody that selectively binds to a  $16 \pm 4$  kDa antigen of Sarcocystis neurona and a monoclonal antibody that selectively binds to a  $30 \pm 4$  kDa antigen of Sarcocystis neurona wherein the antigens are separately isolated from Sarcocystis neurona merozoites by two-dimensional polyacrylamide gel electrophoresis and separately used to produce hybridomas which produce the monoclonal antibodies for the mixture.

The examiner relies upon the following references:

Liang et al. (Liang 1997), "Micropreparative High Resolution Purification of Proteins by a Combination of Sodium Dodecyl Sulfate-Polyacrylamide Gel Electrophoresis, Isoelectric Focusing, and Membrane Blotting," Anal. Biochem., Vol. 250, pp. 61-65 (1997).

Liang et al. (Liang 1998), "Evidence that Surface Proteins Sn14 and Sn16 of Sarcocystis neurona Merozoites Are Involved in Infection and Immunity," Infection and Immunity, Vol. 66, No. 5, pp. 1834-1838 (1998)

Harlow et al. (Harlow), Antibodies, A Laboratory Manual, Chapter 6, Cold Spring Harbor Press (1988).

Claims 36, 51 and 52 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Liang 1998 or Liang 1997 and Harlow.

After careful review of the record and consideration of the issue before us, we affirm.

#### DISCUSSION

The claims stand rejected under 35 U.S.C. § 103(a) as being obvious over the combination of Liang 1998 or Liang 1997 and Harlow.

Liang 1998 is cited for teaching the identification of S. neurona merozoite antigens from samples from horses with neurological signs typical of equine

myeloencephalitis (EPM) or confirmed EPM. See Examiner's Answer, page 3.

The antigens so identified include a 30 KD antigen and a 16 KD antigen, which, according to the reference, appear to be cell surface antigens of merozoites.

See id. The examiner states that "[a] combination of the results of western-blot analysis (figure 1) and trypsin digestion (figure 3 B) suggests that these are important surface proteins that could be used in specific diagnosis of *S. neurona* infection, as candidate antigens for vaccine development and specific antibodies to these antigens lyse merozoites via complement or inhibit their attachment and penetration to host cells." Id. Liang 1998 is also cited for teaching that monoclonal antibodies are often used to study parasitic proteins. See id. The examiner acknowledges that while "[a]ntibodies to 16KD antigen not only recognized the 16KD antigen but also lysed the merozoites in in vitro neutralization assays . . . antibodies to 30KD recognized the 30KD antigen but could not inhibit in vitro neutralization of merozoites, as 30KD antigen appears to cross-react with serum obtained from horses infected with other *Sarcocystis* species." Id. at 4. The examiner concludes "[t]hus the prior art teaches 30KD, 16KD, 14KD and 11KD proteins as merozoite surface antigens that are involved in *S. neurona* infection and EPM and could be used in the specific diagnosis of *S. neurona*." Id.

Liang 1997 is cited for teaching "purified 30 KD and 19 KD (i.e. 16 KD +/- 4) antigens from *S. neurona* merozoites by using infected horses serum." Id.

The rejection acknowledges that "Liang 1998 or Liang 1997 does not teach monoclonal antibody that selectively binds to 16KD antigen or a monoclonal antibody that selectively binds to a 30KD antigen or a monoclonal antibody mixture." Id.

Harlow is cited for teaching methods for "making monoclonal antibodies to any given antigen." Id.

The rejection concludes:

It would have been prima facie obvious to one, having ordinary skill in the art at the time the invention was made to make monoclonal antibodies to merozoite surface antigens including 16KD and 30KD because Liang [ ] taught detection of *S. Neurona* infection using serum and sometimes infected horse serum cross reacts with antigens such as 30KD. Further, the art suggests monoclonal antibodies are often used to study parasite (page 1837, last paragraph) proteins and EPM disease occurs after merozoite passes through the vascular endothelium of blood-brain barrier into the central nervous system, and so humoral responses play essential role in blocking this migration and specific cytotoxic T cells are ineffective in attacking merozoite migration to the central nervous system in the blood stream (pag[e] [sic] 1837, left column, third paragraph). Therefore an artisan of ordinary skill would have been motivated to use readily available and purified surface antigens (Liang [ ] 1997) from merozoites including 16KD and 30 KD as disclosed by the prior art Liang [ ] 1998 or Liang [ ] 1997 with a reasonable expectation of success for raising monoclonal antibodies by using well established hybridoma technology as taught by [Harlow] because Liang [ ] 1998 suggests that humoral immunity to *S. neurona* infection is important (see page 1836 under discussion) especially in EPM disease and surface antigens including 30KD, 16KD, 14KD are immunoreactive with infected serum that are useful for the detection of the pathogenic *S. neurona* and Liang [ ] 1997 teach purification of target merozoite proteins 19 KD, 30 KD and 100KD. Moreover, it has become routine in the art to make monoclonal antibodies for characterizing and purifying proteins especially target proteins such as surface proteins of parasites or envelope proteins of bacteria.



Id. at 4-5.

We initially note that we find the Liang 1997 reference to be cumulative to the Liang 1998 reference, thus we focus our analysis on the Liang 1998 reference.

It is axiomatic that "the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art. '[The Examiner] can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references.'" In re Fritch, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (citation omitted). An adequate showing of motivation to combine requires "evidence that 'a skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed.'" Ecolochem, Inc. v. Southern Calif. Edison Co., 227 F.3d 1361, 1375, 56 USPQ2d 1065, 1076 (Fed. Cir. 2000). We find that the rejection establishes a prima facie case of obviousness that has not been rebutted by appellants, and the rejection is affirmed.

Appellants argue that the combination does not provide any motivation to make the claimed monoclonal antibodies or the claimed mixture of antibodies. See Appeal Brief, page 6. Appellants acknowledge that "[g]enerating antibodies to a given antigen or epitope may have become routine in recent years," id. at 7,

but contend that “[t]here must also be a clear objective or motivation for one skilled in the art to combine the prior art.” See id. Appellants assert that “the prior art references do not identify any need for making antibodies against the [16 and 30] kDa antigens or identify any problem that the antibodies could be used to solve.” Id. at 14. Appellants contend that the rejection apparently relied on the “notion that making antibodies is routine” to provide the motivation to combine Liang 1998 with Harlow, which, according to appellants, is an impermissible hindsight rejection. See id. at 14.

Appellants argue with respect to claims 51 and 52 that the ordinary artisan would not have had motivation to make antigens against the 30 kDa antigen, because, while Liang 1998 suggests that the 16 kDa antigen appears to be an important antigen, Liang 1998 “suggests that the 30 kDa antigen is not important because it had no inhibitory activity and antibodies against the antigen were not recognized to be specific.” Appeal Brief, page 15 (references omitted). Thus, appellants conclude, the ordinary artisan would not have been motivated to produce monoclonal antibodies against the 30 kDa antigen as in claim 51, or to produce a mixture containing that antibody as in claim 52.

Appellants’ arguments are not convincing. As noted by the rejection, Liang 1998 specifically teaches that “monoclonal antibodies are often used to study parasitic proteins.” See Liang 1998, page 1837, Col. 2. Moreover, Liang 1998 also teaches that *Sarcocystis neurona* is the etiologic agent of equine protozoal myeloencephalitis, see Liang 1998, page 1834, Abstract and Col. 1,

thus providing motivation to study and detect the parasite. Liang 1998 also teaches that antibodies specific for the 16 kDa antigen have protective activity against *S. neurona* and “support the use of the immunoblot test in diagnosis of [equine protozoal myeloencephalitis],” thus providing motivation to generate antibodies against the 16 kDa antigen.

With respect to the 30 kDa antigen, although Liang 1998 teaches that the antibodies are immunoreactive with sera from horses, infected with other *Sarcocystis*, it also teaches that monoclonal antibodies are often used to study parasitic proteins. Therefore, one of ordinary skill would have been motivated to produce antibodies to the 30 kDa antigen in order to study the antigen in *S. neurona* and other *Sarcocystis*. And one of ordinary skill would understand that a mixture of monoclonal antibodies to the 16 and 30 kDa antigens would allow one to determine if *Sarcocystis* other than *S. neurona* were present in horses with equine protozoal myeloencephalitis.

Appellants argue further that the combination of Liang 1998 and Harlow does not enable one skilled in the art to prepare antibodies against the 16 and 30 kDa antigens. See Appeal Brief. While, according to appellants, Liang 1998 demonstrates that the antigens are antigenic in horses, Harlow relates to the production of monoclonal antibodies in mice, and there is no teaching or suggestion in Liang 1998 that the antigens would produce antibodies, i.e., be antigenic, in mice. See id. at 11-12. Appellants distinguish Ex parte Erlich, 3 USPQ2d 1001 (Bd. Pat. App. & Int. 1986) by arguing that “because even though

Liang . . . (1998) show[s] that the 16 and 30 kDa antigens are antigenic, there is no prior art which shows that the method of [Harlow] could be adapted to produce monoclonal antibodies against the [16 and 30] kDa antigens.” Id. at 13-14. Appellants conclude that the prior art does not provide a reasonable expectation of success that monoclonal antibodies could be generated against the 16 and 30 kDa antigens. See id. at 14.

Again, appellants’ arguments are not found to be convincing. As acknowledged by appellants, methods for obtaining and screening for monoclonal antibodies were well known at the time of invention. See also In re Wands, 858 F.2d 731, 736, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988). Because the 16 and 30 kDa antigens from *S. neurona* were antigenic in horses, one of ordinary skill in the art would expect them to be antigenic in other mammals, such as mice. Moreover, appellants themselves refer to the 16 and 30 kDa proteins from *S. neurona* as antigens, and define an antigen as “a substance which stimulates production of antibody or sensitized cells during an immune response,” Specification, page 12, thus one of ordinary skill would expect the 16 and 30 kDa antigens from *S. neurona* to be antigenic in mice. Finally, all that is required is a reasonable expectation of success, not absolute predictability of success. See In re O’Farrell, 853 F.2d 894, 903, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988).

CONCLUSION

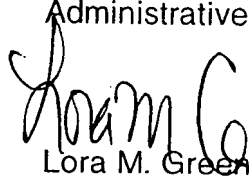
Because the examiner has established a prima facie case of obviousness that has not been rebutted by appellants, the rejection of claims 36, 51 and 52 under 35 U.S.C. § 103(a) is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

  
William F. Smith  
Administrative Patent Judge

  
Eric Grimes  
Administrative Patent Judge

  
Lora M. Green  
Administrative Patent Judge

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Application No. 09/669,843

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